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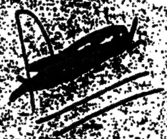

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RECOMMENDATIONS CONCERNING THE NATIONAL MANAGEMENT STRUCTURE FOR MISSILE AND SPACE FLIGHT GROUND DATA EQUIPMENT

19 November 1959

Re [illegible] 19 Nov 59
GP-3

Lt. General B. A. Schriever, USAF

Colonel O. J. Glasser, USAF

Lt. Colonel A. R. Sult, USAF

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16 JAN 1981

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Briefings -

~~SECRET~~ Last Copy of Cisler Briefing

C-9-124671

Remarks by Lt. General B. A. Schriever

Last week in my comments concerning Ground Data Equipment (GDE) supporting ballistic missile and space programs I emphasized three major points which the Air Force believes are of primary importance in this matter.

That the existing national organizational structure, with the addition of certain administrative actions and directives (which are within the present authority of DOD and NASA), is adequate to efficiently and economically carry out the nation's space programs.

That in the case of space systems being developed to perform a specific military (or civilian) mission, such as reconnaissance, warning, communications, navigation, etc., the GDE (except normal range support) is an integral part of the over-all system.

That such military systems will not be performing new military mission; they will simply perform existing missions better, and therefore must be integrated with existing systems and, for operational use, fall naturally within the scope and mission responsibilities of existing JCS Unified and Specified commands.

At that time you requested that we present these views, supported by charts which graphically portray the reasoning that leads to our conclusions. This I am prepared to do, and I have with me two members of my staff who will present this reasoning in detail.

POST *Sputnik* SPACE PROBLEMS

- LACK of CLEAR NATIONAL SPACE POLICY.
- CONFUSION RESULTING FROM DIVISION of R&D AND OPERATIONAL ROLES.
- COMPETITION RESULTING FROM CONFUSION.
- MAJOR BOOSTER ASSIGNMENTS to ABMA and BMD
- OVER ORGANIZATION:

NSC	CMLC	ASST SEC DEF R&D	ARMY	ABMA
NASC		DIRECTOR G.M.	NAVY	SPO
NASA		ARPA	USAF	AFBMD

- LACK of CLEAR PROCEDURES and FOCAL POINTS.
- HI-LEVEL and PUBLIC ATTITUDE THAT SPACE is UNIQUE. (SPACE PROVIDES NO NEW MISSIONS)

First, however, I should like to cover one aspect personally; namely, the problems which developed "post Sputnik" and created confusion in the space program, and recent actions which, if given a little time, should alleviate this confusion.

On this first chart (chart 1) I have listed some of the "Post Sputnik Space Problems," which contributed to the confusion of our space efforts.

The lack of a clear cut national space policy resulted in frantic, but somewhat uncoordinated efforts to make up lost time and meet the challenge of Sputnik.

With the creation of ARPA, programs for the development of military systems were taken away from the services and although R&D was conducted through a given service, there was no assignment of operational responsibility. The inevitable result was to destroy the systems approach and to make impossible the concept of concurrency.

As a result of this confusion, "space" was essentially "up for grabs" and each of the services as well as the other space agencies vied for new roles, or preeminence in the space field.

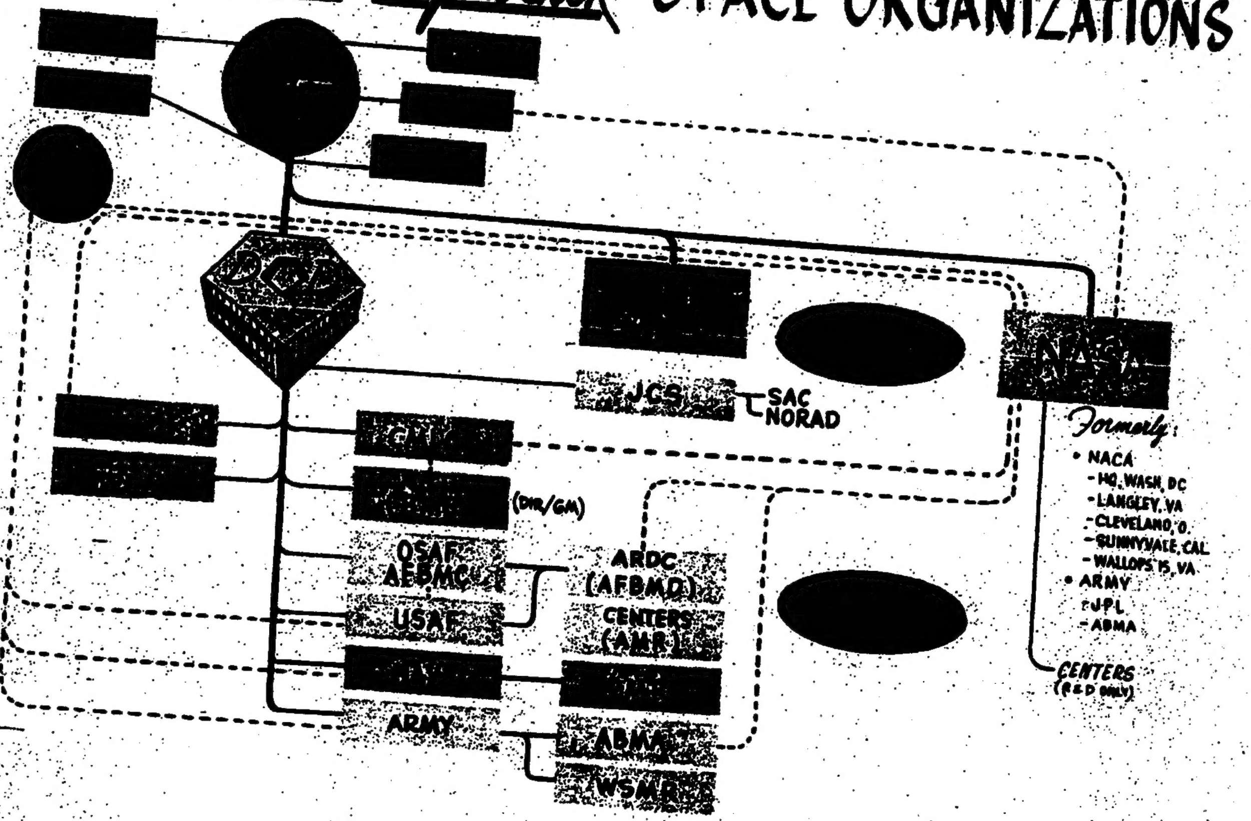
The competition was further heightened by the assignment to both the Army (ABMA) and the Air Force (AFBMD) of major space booster programs.

There arose a general tendency for over-organization. This was especially apparent in the OSD which at one time included not only the Assistant Secretary of Defense for R&D, but also the Director of Guided Missiles and the Advanced Research Projects Agency. Each of these offices had a role in the space program, but it was never clear to the field organizations just which part resided with which office.

The absence of clearly defined procedures and focal points within the various "space" agencies resulted in informal, out-of-channel contacts becoming standard practice.

Finally was the "catchword" status accorded to space not only by the public, but by high level officials as well. As I stated earlier, space is not unique, and it does not enable the conduct of new missions; it simply performs the old missions better.

Post Sputnik SPACE ORGANIZATIONS



The general confusion of this period can be visualized by examining the next chart (chart 2) which shows the principal "Post Sputnik Space Organizations" and some of the communications channels that existed between them. Add to this, the unofficial channels that were employed on a daily basis and the chart becomes nearly illegible. Had the ballistic missile program been conducted under such procedures we could not possibly have made the rapid advances which we did.

So much for the confusion of the past. In recent months I have been encouraged by a definite trend to overcome some of these deficiencies and actions which, given a little time, will alleviate many of our difficulties. There are additional actions required, which we will identify in detail later, but let me first review the progress to date.

*RECENT ACTIONS and TRENDS for Improvement

- DDR&E HAS EMERGED AS DOD FOCAL POINT
- ARPA VACATING SPACE SYSTEMS AREA (under DDR&E)
- TRANSFER of ABMA to NASA
- NASA ROLE CLARIFYING
- OSD TRANSFER of MILITARY SYSTEMS R&D and OPERATIONAL ROLE TO SERVICES.
- PRECEDENT ESTABLISHED by GEN YATES ASSIGNMENT as DOD MERCURY COORDINATOR.

On this chart (chart 3) I have tabulated some of the "Recent Actions and Trends for Improvement" which give use to the confidence I have evidenced.

In the reorganization of OSD, the Director of Defense Research and Engineering has clearly emerged as the DOD focal point for space matters.

The Advanced Research Projects Agency is currently transferring its responsibilities for military space systems to the several services and the trend seems to be that ARPA's future activities will concern solely with projects of an advanced research nature.

With the transfer of ABMA to NASA the Air Force has emerged as the OSD agency primarily responsible for space boosters.

As time has passed, and the above actions taken, the future role of NASA has become considerably clearer.

The transfer to the services of the responsibility for designated military space systems will do much to eliminate confusion and competition.

The precedent established by the assignment of General Yates as the OSD coordinator for the MERCURY project creates a pattern which will provide efficient future operations without the necessity for major reorganization or the creation of new agencies.

In summary, I am encouraged by recent progress and feel that with some further revisions to our policies and procedures, we will attain an effective organization for the timely and economical conduct of our national space effort.

Now Colonel Glasser will cover in greater detail the reasoning which leads the Air Force to the conclusions I have enumerated and will present some specific recommendations for further policy and procedure decisions which the Air Force feels are required.

Lt Colonel Sult will supplement these remarks by developing for the case of SAMOS:

> The technical interface between the satellite borne and the ground equipment.
>
> The man-machine relationships of the over-all program.
>
> The time phasing of the various elements of the program, with specific reference to the need for concurrent planning and action.

OBJECTIVE

PROPOSE A MANAGEMENT SYSTEM FOR ORGANIZING & OPERATING SPACE FLIGHT SUPPORTING RESOURCES WHICH:

- IS RESPONSIVE TO THE VARIED NEEDS of DEVELOPERS, OPERATORS & USERS.
- PROVIDES FLEXIBILITY for PRESENT & FUTURE PROG'S.
- EXPLOITS PRESENT INVESTMENT.
- CONSERVES RESOURCES.

Remarks by Colonel O. J. Glasser

General Schriever has indicated that in the opinion of the Air Force, the existing National organization structure strengthened and clarified by certain policies and procedures, is adequate for the efficient and economical management of the space flight ground data equipment program. I propose to review with you the Air Force reasoning that leads to this conclusion and to graphically demonstrate how this National organization would operate in specific programs.

Any organizational system which we might consider must serve several ends simultaneously. The space program is big, it is costly, tremendously urgent and changing at a very rapid pace. The National management structure for the acquisition and operation of supporting ground equipment required for space flight must provide the following (chart 4):

First, it must be responsive to the needs of the developers as well as the eventual operators and the users of the data it acquires. This is true not only because of the urgent necessity for drastically reducing our lead times but also because, in the case of military operational systems, much of the equipment utilized during the Research and Development program is the identical equipment which provides an initial operational capability and then phases over to the eventual operational use. Secondly, the system must be sufficiently flexible to satisfy the dynamic needs of a rapidly changing program. Each new program creates requirements for equipment, some of which may be in existence from previous programs, others of which have never been thought of before. A flexible management system will enable the rapid diversion of existing equipment or the timely acquisition of additional equipment required by the new program. Thirdly, the system must be economical of government resources, with due consideration for present investments and prudent expenditure of additional funds. While from an individual project directors point of view it may be desirable to have a complete set of equipment under his direct management control, and admittedly we have had some instances of this practice in the past, economy dictates that prudent and efficient use be made of common equipment to safisfy the needs of all programs both present and future.

Now I would like to talk for a minute about space as a general area of endeavor. It is a new challenge which has burst upon the world largely within the past two years, and as is usual in such situations, space has become a catchword. Actions are taken on a "space for space sake" basis with inadequate consideration to the actual end-goal. There are proposals that we should gather all space activities into a single organization and thereby achieve a measure of discipline over this seemingly singular area of activity. As you know, the Air Force does not share this view because we feel that space is multifaceted and that it would be no more proper to gather all space activities into a single agency than it would be to collect all aeronautically oriented activities under the control of a single manager.

PROGRAM CYCLE

1 ESTABLISH REQUIREMENT (SERVICE or NASA)
2 PREPARE DEVELOPMENT & OPERATIONS PLAN
3 PROGRAM & BUDGET TO MEET PLAN
  (INCLUDE IDENTIFICATION of GDE)
4 COORDINATION & APPROVAL -
5 IMPLEMENTATION
  ⓐ R&D
    1 PROVIDE FACILITIES (COMMON & UNIQUE)
    2 CONDUCT TESTS
  ⓑ ACHIEVE OPERATIONAL CAPABILITY
6 ASSIGN MISSION & EQUIPT TO JCS COMMAND

Let me discuss then some of the characteristics of space programs which lead the Air Force to these conclusions. It will first be necessary for us to examine how programs are generally conducted regardless of their type or service agency (chart 5). As a starting point there must be a recognition of a system requirement and obviously this will be accomplished by the agency having the mission responsibility. This would be one of the three services in the case of military systems or the NASA in the case of a scientific system.

Having recognized the requirement, the next step is to prepare a development plan which will satisfy it. Here again, the agency having the mission responsibility will formulate the plan, but note that at this point it will be necessary for the primary agency to coordinate with other agencies which will be assisting in the accomplishment of the plan in a support role.

With these inputs, the next step is to delineate the program in detail and prepare the budget necessary to support it. Upon securing the coordination of participating agencies that all aspects of the program are sound, that the budget is adequate, and that existing capabilities and resources have been fully considered and exploited, the next step is to secure approval to proceed. In the case of military systems such approval will normally be granted by DOD based upon JCS comment; while in the case of civilian programs such approval will be obtained from the Administrator of NASA.

We are now ready for the implementation phase of the program and must start with Research and Development.

At this point it is necessary to secure the assignment of designated existing facilities and to construct any new facilities required by the program. With all assets now in being, (and for simplicity I have restricted consideration to GDE) the test program can commence, and as it proceeds, there will be a subtle transition from research and development into quasi-operational status. In other words, even crude R&D information can have operational value. For most civilian systems, as we see them today, this is probably the end of the line. For military systems, on the other hand, there remains yet the final step of assignment of the operational mission to the unified or specified command of the JCS. It is certainly within the realm of possibility, however, that at some future date, certain non-military systems may be assigned to civilian operational agencies to perform in the public service.

The next area, which I believe requires consideration and analysis, is the vast scope of the space program. Too often the space program is thought of as including only the more exotic programs such as lunar probes, talking satellites, etcetera. In actuality, it is far broader than this. (chart 6)

MISSILE & SPACE PROGRAMS

Include:

1. BALLISTIC MISSILES
2. SATELLITES (HIGH AND LOW)
    - ⓐ MILITARY SYSTEMS
    - ⓑ CIVILIAN & SCIENTIFIC
3. ADVANCED DEVELOPMENT PROGRAMS
4. SURVEILLANCE
5. DEEP PROBES

*

By far the largest segment of the program, and that which has created the great majority of our existing facilities, is the ballistic missile program including ATLAS, TITAN, THOR, POLARIS, JUPITER and the others. I emphasize this because most space operations are heavily dependent upon the ballistic missile program and its extensive network of ground data equipment, its vast industrial base, its launch complexes, trained personnel and so forth.

The second category of space programs are the high and low satellites, both military and civilian. Generally, these have a specific end objective as in the case of SAMOS, MIDAS, TRANSIT, or the Communications Satellite. For the most part, the additional ground equipment required for these programs is directly related to the orbiting payload or the mission of the particular satellite.

A third area is the general class of advanced development programs for which a specific operational mission is not assigned but which might lead to capabilities which will enable the development of future missions. Typical of this class are the MERCURY, DISCOVERER and DYNA SOAR. Again, there is additional equipment required beyond that available from the ballistic missile programs but it is unique to the particular program and does not have an eventual operational use.

Somewhat related to this class are the deep space probes whose purpose at this time is largely the acquisition of scientific knowledge. It is probable that at some future date, military missions will be based on such vehicles, but until that time, these programs will be purely experimental and are the responsibility of NASA as in the case of the Able Series.

Finally, we have the space surveillance programs such as, Space Track, Dark Fence, etc. It is perhaps in this category that the greatest amount of mushrooming of facilities has occurred. While there is undoubtedly a requirement for a future defensive capability to detect enemy satellites, the existing stations were not built in response to such a requirement. Rather they are the by-product of other scientific activities which were impressed into service as a result of the post-Sputnik panic. At such time as an integrated detection system is developed, it should be assigned to the operational control of NORAD.

General Schriever has repeatedly emphasized the very urgent necessity for employing the system approach and for taking concurrent action in those programs having a specific operational mission as their end objective. He has described how this philosophy has contributed to the rapid and effective accomplishment of the ballistic missile programs, and has urged that the same approach be employed for certain of the space programs. You will recall his comments regarding the very tight technical interface that exists between the airborne elements of the system which I will call the payload or mission equipment and the ground elements of the system with which we are primarily concerned today. Moreover, there is an additional interface between these ground elements and the command-control and intelligence nets which make use of the acquired data. Colonel Sult will elaborate on these points with respect to a particular space system, the SAMOS.

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SAMOS CONCEPT

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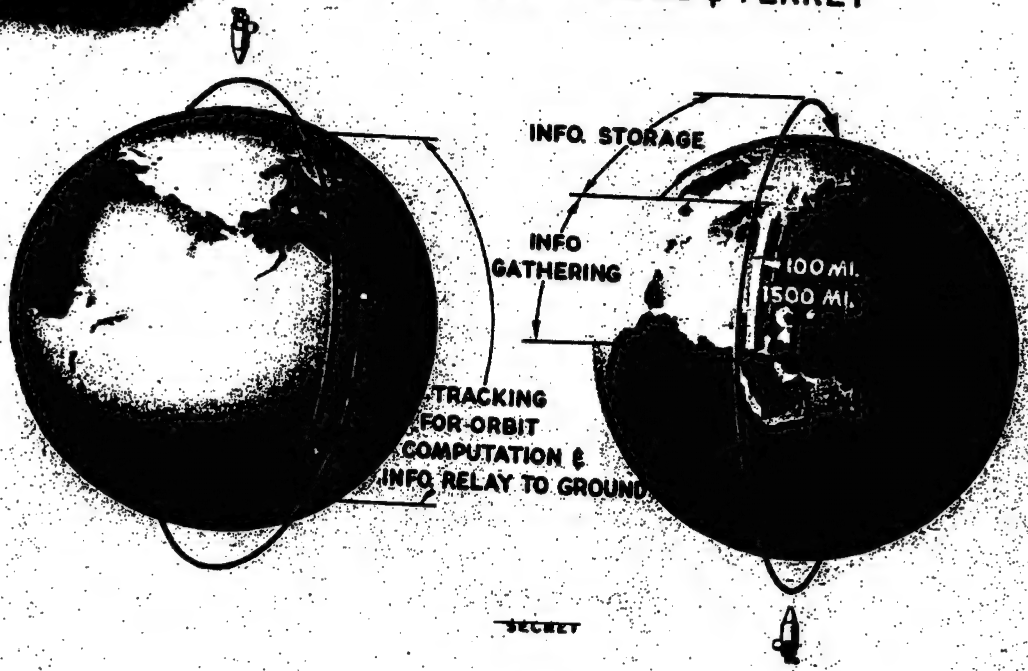

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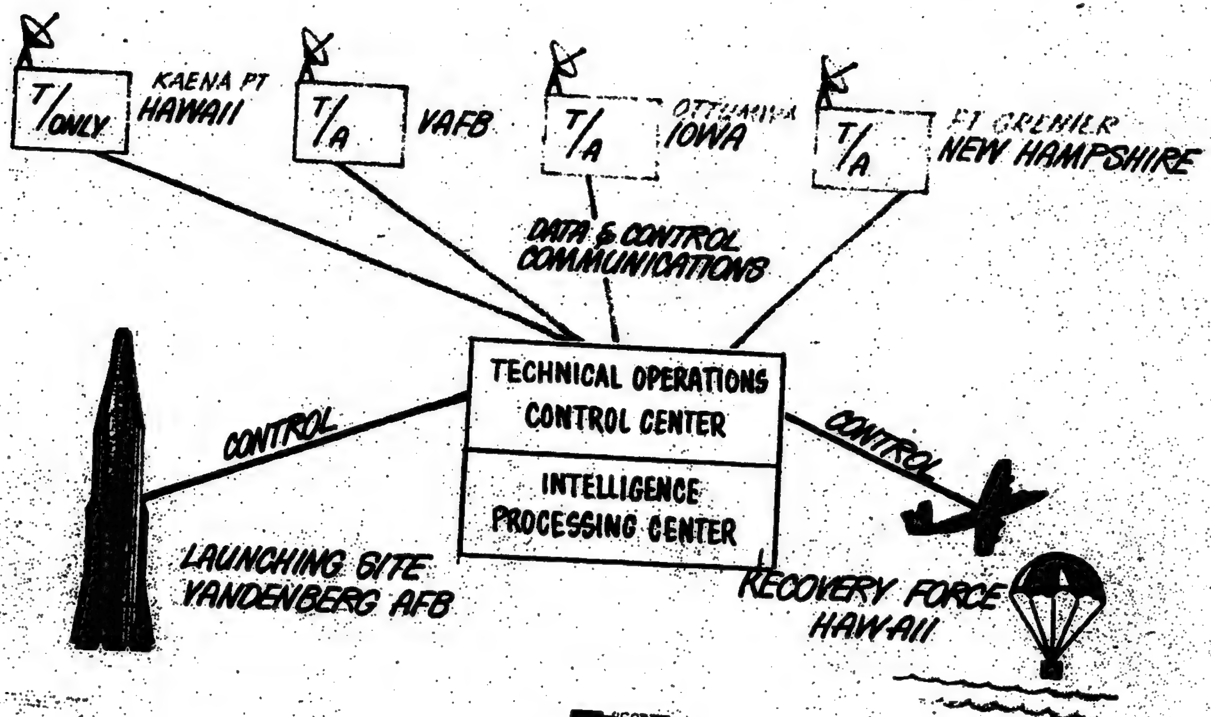
SAMOS OPERATIONAL CONFIGURATION



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Remarks by Lt. Colonel A. R. Sult

The mission of the SAMOS program, as you know, is to gather photo and electronic intelligence information over Russia, as shown in this chart. (chart 7)

This information is stored in the satellite payload on film and on magnetic tapes until the satellite moves into range of a tracking and acquisition station. (T/A) The satellite is then commanded to read-out its stored information, through the data reception antenna, into specialized recorders, photo processors, data computers, and electronics memories at the station. (chart 6) Simultaneously, the vehicle describes its operating conditions and receives commands which determine what it will look at on its next orbit. The T&A station retransmits the received data to the Intelligence Processing Center for processing into usable form. The data is then subjected to extensive analysis by intelligence experts, correlation with other data, and distributed as directed to the National Intelligence Community.

In developing SAMOS we left as much equipment on the ground and put as little in the satellite as good design practice would allow. This is a good procedure both from the standpoint of reducing vehicle weight and of improving system reliability. The result is a very tight interface between the satellite borne and ground based portion of the system.

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SS/F GROUND DATA FLOW

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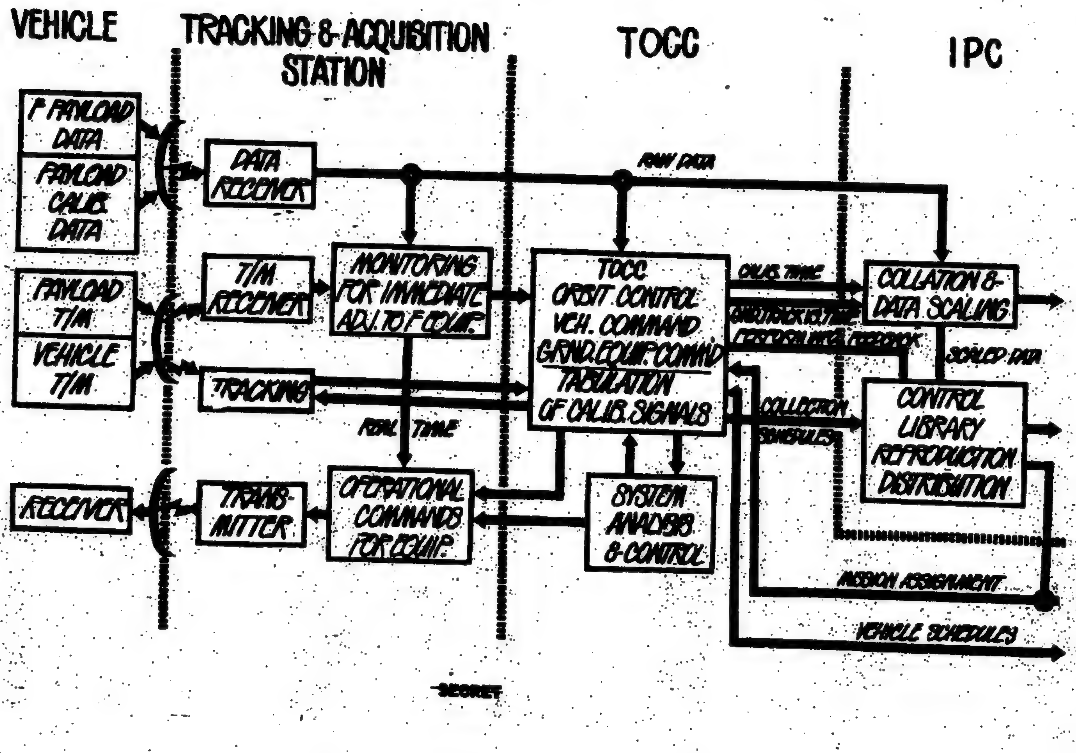

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This chart (chart 9) depicts the data and command flow for only the electronic intelligence function. You will notice a rather complex input and output data flow between the satellite, the tracking and acquisition station, the Technical Operations Control Center (TOCC) and the Intelligence Processing Center (IPC). The technical requirements of the system elements are so functionally interdependent that separation of one element from the rest of the system would be quite difficult. All these elements are peculiar to the system and are essential to efficient systems operation and control.

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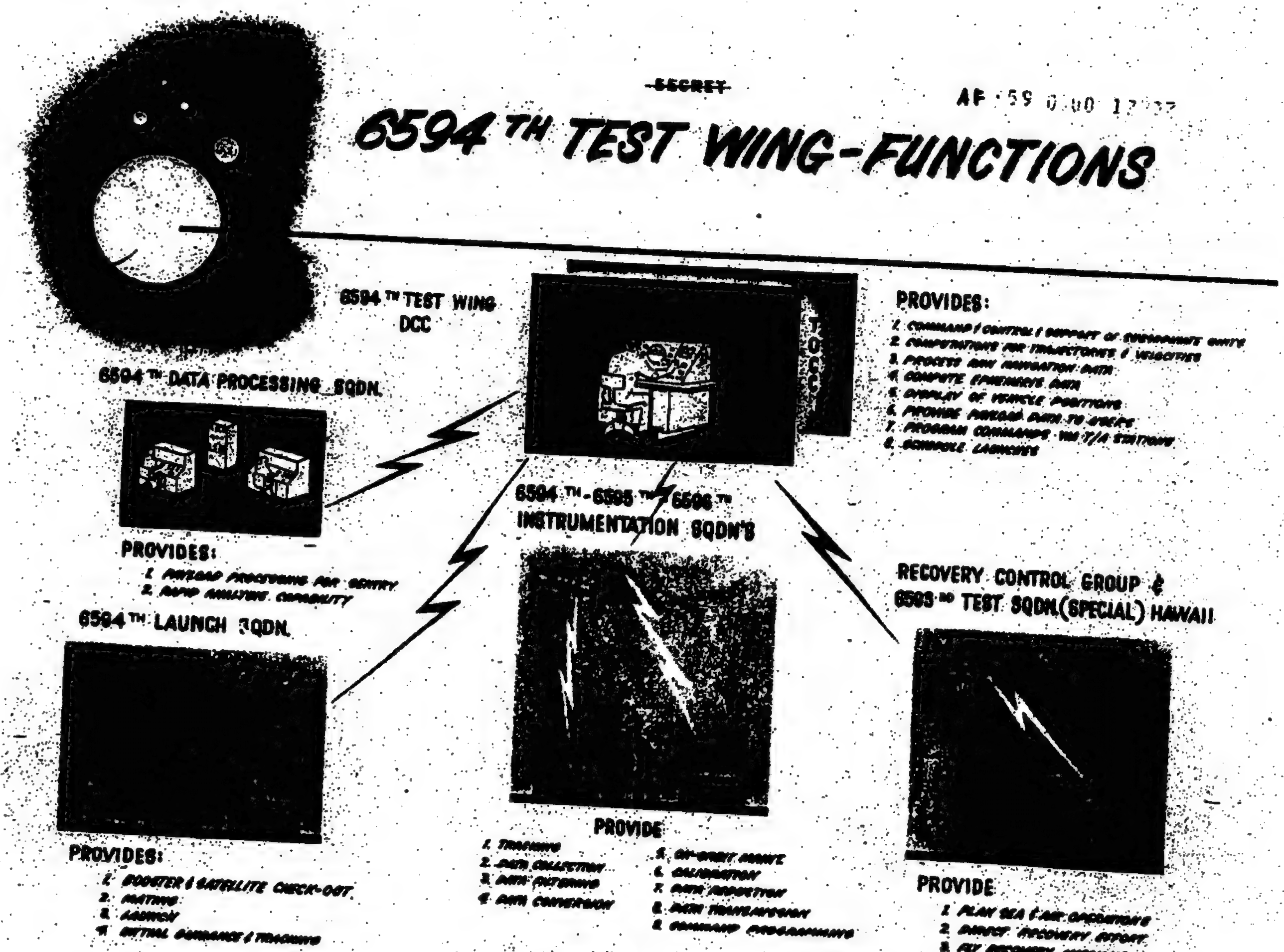
6594TH TEST WING-FUNCTIONS



6594TH TEST WING DCC

PROVIDES:

1. COMMAND / CONTROL & SUPPORT OF SUBORDINATE UNITS
2. COMPUTATIONS FOR TRAJECTORIES & VELOCITIES
3. PROCESS RAW NAVIGATION DATA
4. COMPUTE EPHEMERIS DATA
5. DISPLAY OF VEHICLE POSITIONS
6. PROVIDE PAYLOAD DATA TO USERS
7. PROGRAM COMMANDS VIA T/A STATIONS
8. SCHEDULE LAUNCHES

6594TH DATA PROCESSING SQDN.

PROVIDES:

1. PAYLOAD PROCESSING FOR SENTRY
2. RAPID ANALYSIS CAPABILITY

6594TH LAUNCH SQDN.

PROVIDES:

1. BOOSTER & SATELLITE CHECK-OUT
2. MATING
3. LAUNCH
4. INITIAL GUIDANCE & TRACKING

6594TH-6595TH-6596TH INSTRUMENTATION SQDN'S

PROVIDE

1. TRACKING
2. DATA COLLECTION
3. DATA FILTERING
4. DATA CONVERSION
5. ON-ORBIT MAINT.
6. CALIBRATION
7. DATA REDUCTION
8. DATA TRANSMISSION
9. COMMAND PROGRAMMING

RECOVERY CONTROL GROUP & 6593RD TEST SQDN(SPECIAL) HAWAII

PROVIDE

1. PLAN SEA & AIR OPERATIONS
2. DIRECT RECOVERY EFFORT
3. FLY RECOVERY MISSIONS

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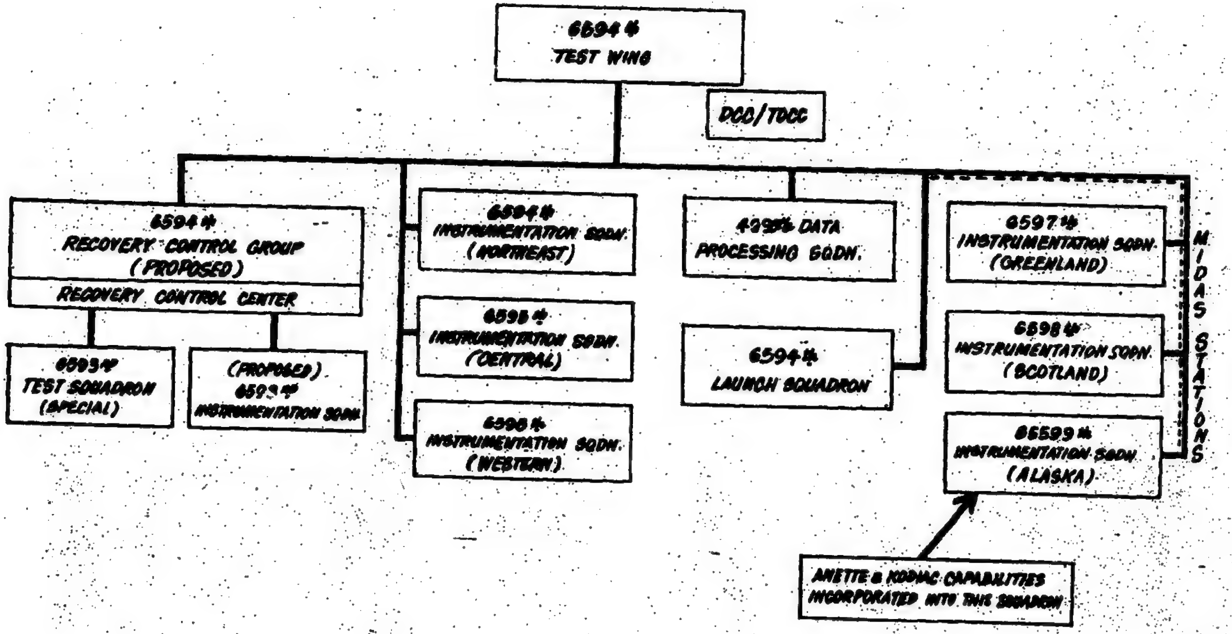
A weapon system consists of not only hardware and facilities but personnel, skills, procedures, and techniques must be developed concurrently with the hardware. This chart (chart 10) depicts the man-machine functional relationships that exist and are required at each of the various facilities within the SAMOS system. I call your attention to the TOCC which is a function within the Wing Headquarters. This is the nerve center of the entire system. It is the command post for systems operation and control. It could be compared to the present day SAC Control Center at Offutt AFB from which SAC exercises positive control of the entire SAC force.

CURRENT 6594th TEST WING ORGANIZATION


6594th TEST WING
DCC/TOCC
6594th RECOVERY CONTROL GROUP (PROPOSED)
RECOVERY CONTROL CENTER
6593rd TEST SQUADRON (SPECIAL)
(PROPOSED) 6593rd INSTRUMENTATION SQDN
6594th INSTRUMENTATION SQDN. (NORTHEAST)
6595th INSTRUMENTATION SQDN. (CENTRAL)
6596th INSTRUMENTATION SQDN. (WESTERN)
4393rd DATA PROCESSING SQDN.
6594th LAUNCH SQUADRON
6597th INSTRUMENTATION SQDN. (GREENLAND)
6598th INSTRUMENTATION SQDN. (SCOTLAND)
65599th INSTRUMENTATION SQDN. (ALASKA)
MIDAS STATIONS
ANETTE & KODIAC CAPABILITIES INCORPORATED INTO THIS SQUADRON

In order to provide for the timely development of personnel skills and techniques we have activated the 6594th Test Wing. This organization and its assigned units will initially participate in the field test program during the R&D phase. In addition, the test wing will insure that all assigned units are operationally ready by the dates specified in appropriate planning documents. The Test Wing will perform the initial operations and maintenance functions for the SAMOS system and provide the operational capability demonstration of the system prior to turning it over to the ultimate operating command. As can be seen from the chart (chart 11) the TOCC function is within the Wing Headquarters. Assigned Units to the Wing include a squadron at each of the tracking and acquisition stations and a data processing squadron co-located with the wing, a launch squadron and a recovery control group.

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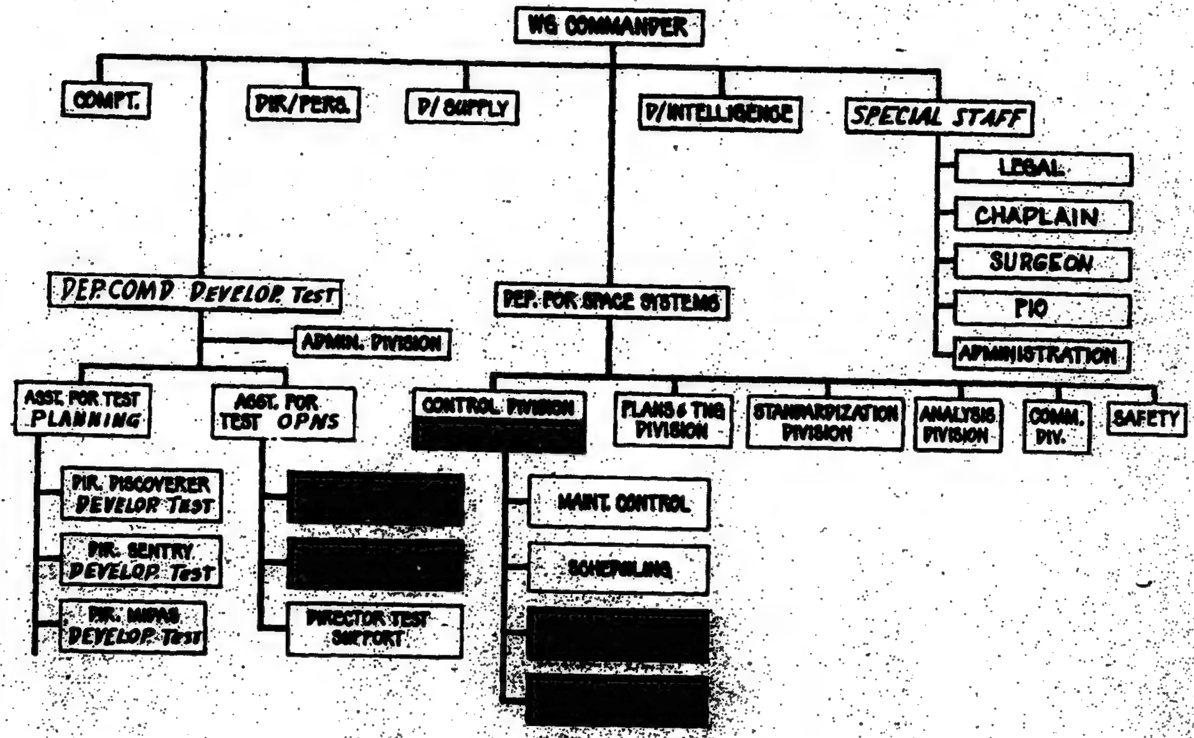
6594TH TEST WING ORGANIZATION



This chart (chart 12) serves to illustrate the internal organization of the Wing Headquarters. The significant part of this organization is that it recognizes the gradual phase-over or evolution from R&D to operations. Personnel that will ultimately be assigned to the operational program are assigned to duty with the Deputy for Development Test during the R&D phase.

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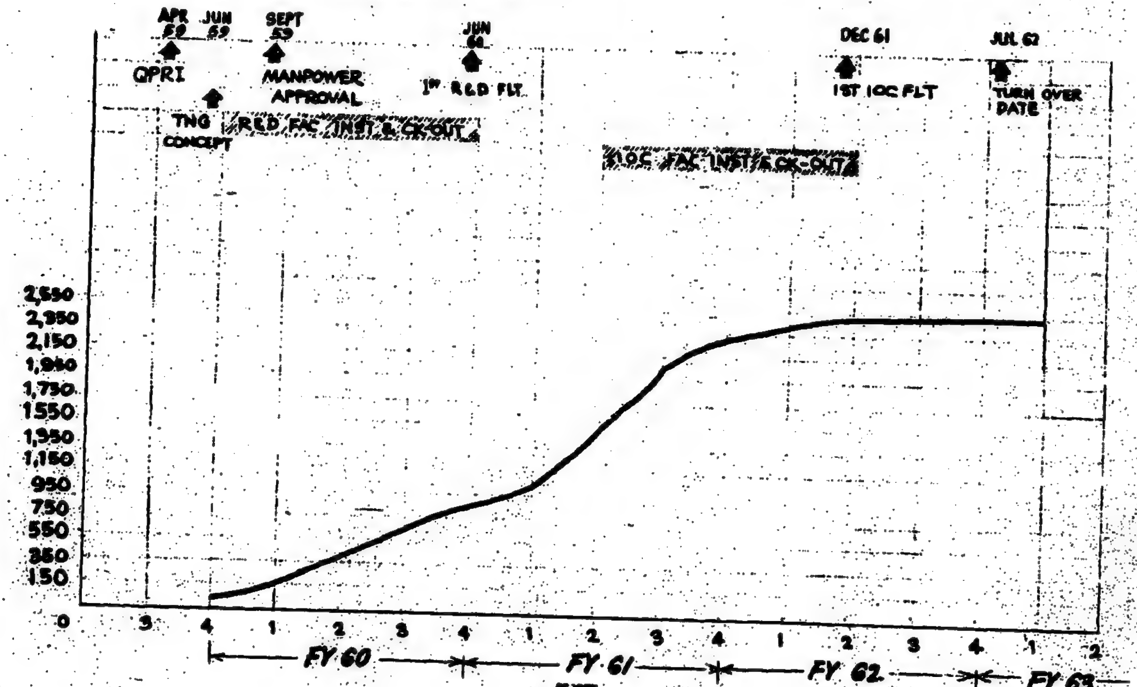
MANPOWER PHASING for 6594th TEST WING and ASSIGNED UNITS

6594th LAUNCH SQ
6594th INST SQ
6595th INST SQ
6596th INST SQ
4999th DATA PROCESSING SQ

6593rd RECOVERY CONTROL GROUP
6593rd FLT SQ
6593rd INST SQ



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Our policy of "concurrency of development" has resulted in a personnel phase-in and build up essentially as follows: (see chart 13)

Personnel have been divided into two categories, CADRE and MAIN COMPLEMENT. The CADRE consist of key command and staff personnel of the various Wing organizations, a single shift technical crew and sufficient organizational support personnel. The cadre philosophy envisions assigning the technical crews on a daily basis with the development contractor. These personnel arrive on site during installation and check-out of the hardware. They participate in the on-site R&D tests and in effect "grow up" with the system. Our second category of personnel is called the main complement. This consists of the remaining staff personnel, technical crews and the total remaining support. These personnel are phased in at appropriate times after system hardware has begun to congeal into a firm configuration. These personnel receive a more formalized type of individual and systems training. We have developed a rather new training concept. We have recognized that we are developing a rather unique and geographically separated ground environment. We further recognize there will be no need for quantity production of this ground environment. We do not believe we can afford to build a training base which would duplicate facilities and hardware for the sake of training alone. For these reasons, our training is programmed to be conducted, for the most part, on-site, utilizing the actual installed equipment on a shared basis with the development effort. This program of developing personnel skills and techniques in parallel with the hardware development is scheduled so as to provide trained and fully manned units at the same point in time that the system hardware becomes operationally usable. You will note that the cadre personnel are phased in so as to be available for participation in the 1st R&D Flight. The remaining main complements are phased in so as to complete the build-up by the initial operational capability date. Several months then remain for complete system shake-down and demonstration of the operational capability prior to turnover to the operating command.

A final significant point in development of space systems such as SAMOS, is that in order to develop and test such a system, it is not enough to merely design and fabricate hardware. It is necessary to operate the hardware and system in its ultimate operational environment and develop the necessary procedures and techniques employing the hardware under test. Our personnel phase-in policy takes advantage of this development operational requirement and tries out the hardware, the procedures, and techniques on the personnel of the type and skill levels that will ultimately be required to operate the system.

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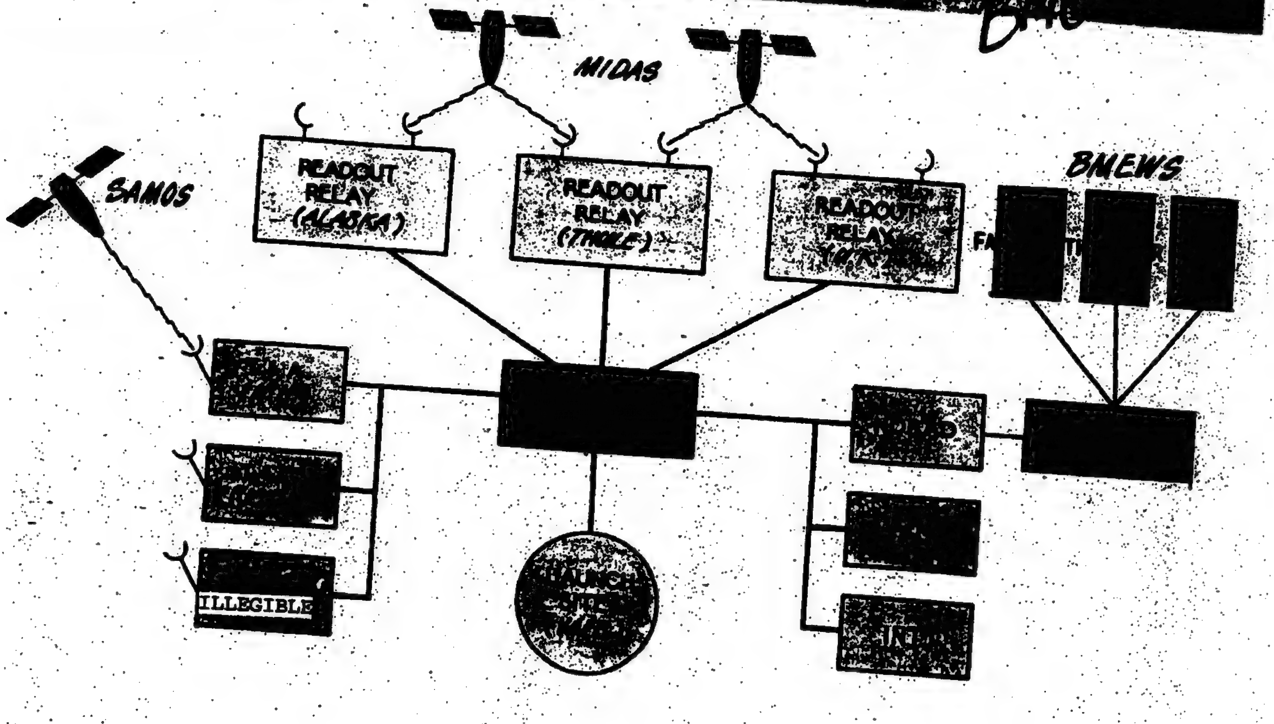

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Not only are we concerned with a rather complex interface problem within the SAMOS system, but we are also concerned with the interface and tie in of SAMOS, MIDAS and BMEWS. This chart (chart 14) depicts the data flow and distribution of all three systems and their inter-relationship. All three of these systems provide warning information - SAMOS provides strategic warning, MIDAS - early warning and BMEWS complements MIDAS by providing confirmation of MIDAS information through reports of actual RADAR tracks. You can see a need to have a management structure, and organizational set-up to respond to the interface problem of programming, budgeting and development. Colonel Glasser will now continue with the development of specific Air Force recommendations.

GROUND EQUIPMENTS *fall into 3 Groups:*

1. COMMON - USE ITEMS-

- *LAUNCH SUPPORT* • *RANGE SAFETY*
- *BOOSTER TELEMETRY* • *METRIC OPTICS*

RANGE RESPONSIBILITY TO PROVIDE and OPERATE

2. UNIQUE SUPPORT ITEMS- EXAMPLES:

- *ABLE GUIDANCE SYSTEM* • *MERCURY GROUND-VEHICLE COMMS.*
- *ATLAS DOWN RANGE GUIDANCE*

PROGRAM FURNISHED - NORMALLY PROGRAM OPERATED

3. OPERATIONAL SYSTEM ITEMS-

- *PAYLOAD DATA ACQUISITION* • *TRACKING and TIMING*
- *COMMANDING TO FUNCTION* • *DATA REDUCTION and ANALYSIS*
- *MONITOR PAYLOAD STATUS*

INSTALLED AND OPERATED BY DEVELOPING AGENCY DURING R&D, THEN TRANSFERRED TO OPERATING AGENCY.

Additional Remarks by Colonel O. J. Glasser

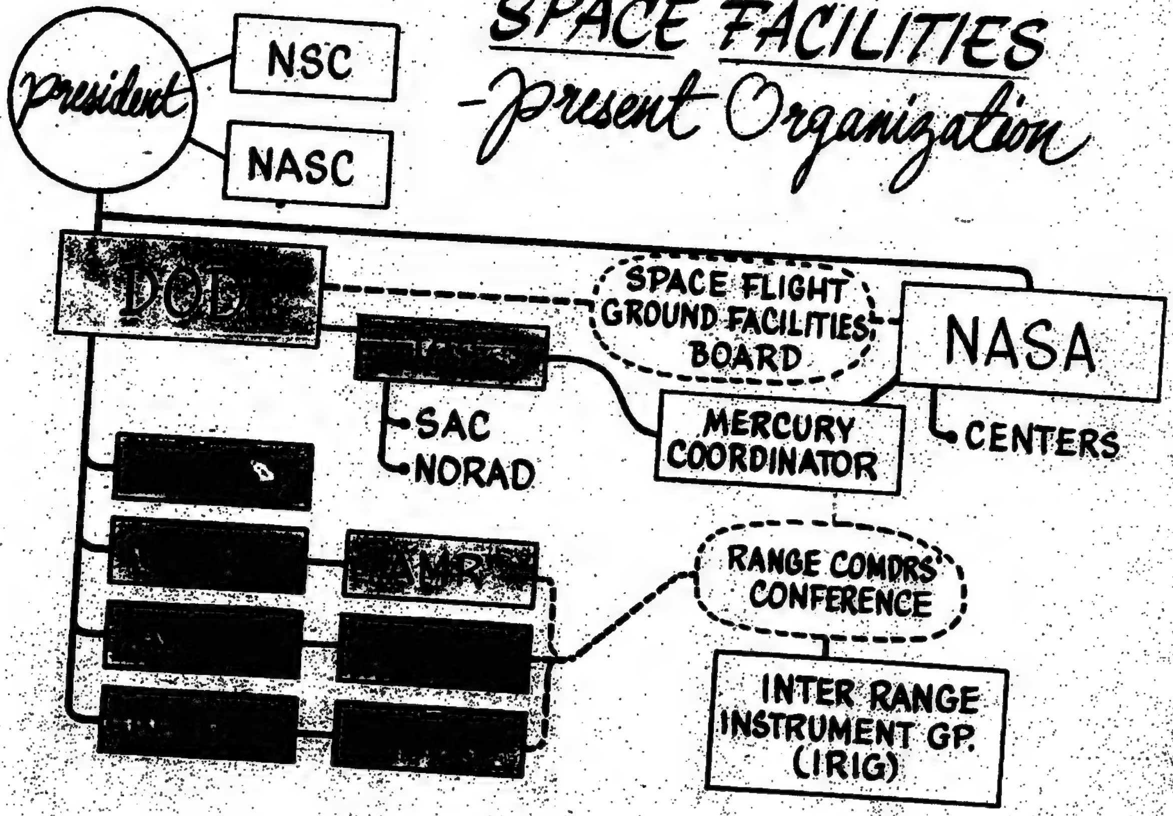
We have dwelt at some length on the nature of space programs, the scope and variety of the Nation's space effort and the necessity for taking a systems approach in a concurrent fashion in order that I might bring into focus certain categories of equipment which should be lumped together and receive management treatment specifically adapted to their requirements. Analysis of these factors leads the Air Force to the conclusion that there are three relatively distinct classes of equipment (chart 15) and that somewhat different procedures are appropriate to each class.

First are the common items which make up the vast bulk of the existing equipment on our National ranges today. These equipments are largely devoted to the powered flight phase of a space program.

In general, they provide the functions associated with launching, data acquisition and providing range safety and, as indicated on the chart, are the responsibility of the National ranges to provide and operate.

Second is a category of items which includes unique equipment for scientific programs or supplementary equipment needed only during the R&D phase of a system program. Normally such equipments will be provided and operated by the developing agency.

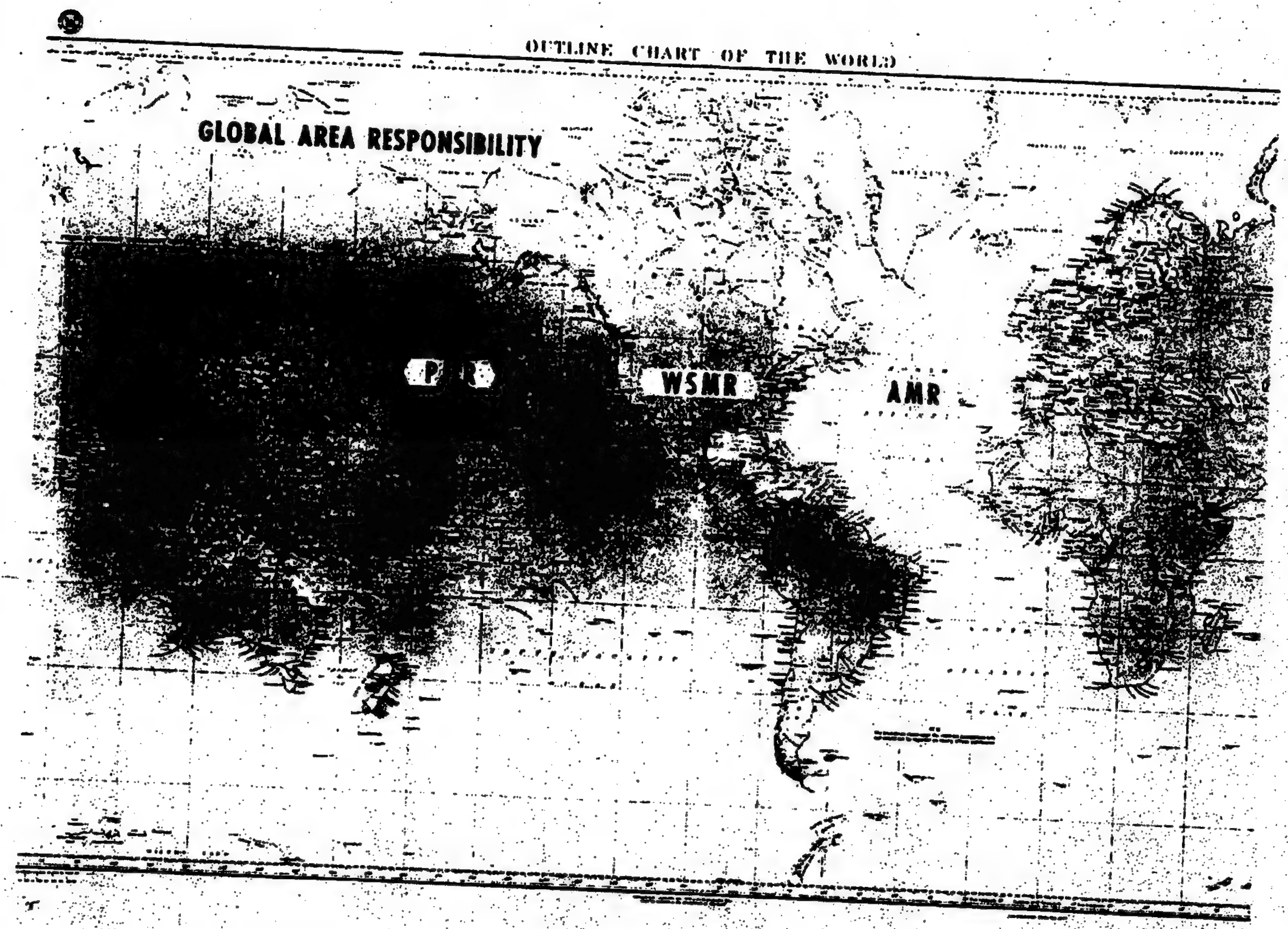
SPACE FACILITIES
-Present Organization



The final category, and one on which the Air Force feels very strongly, includes those items which are specifically and closely related to the system itself or what I will call mission oriented equipments. It is to these items that Colonel Sult was referring when he spoke of the very tight interface between the payload and the ground stations and between the ground stations and the command control and intelligence networks. A further uniqueness of these items is that even during the R&D phase they begin to provide information which has operational value and which upon completion of the development phase are transferred directly to the specified command for the conduct of its assigned mission.

With this background, we should review the pertinent portions of the existing national organization (chart 16) in order that we might examine (1) the way in which it presently functions, (2) the deficiencies which might exist and (3) the further remedial actions which may be desirable. Our analysis of the current organization and a review of presently assigned responsibilities reveals that all of the necessary elements are in existence today and leads to the conclusion that all which is required is some strengthening of the current organization by establishment of new policies and new procedures.

For example, we find that the three National ranges are assigned to the Army, Navy and Air Force respectively. Although numerous documents even from the office of the President allude to their National status, we have been unable to discover a single official document outlining their responsibilities and geographical areas of interest. The Air Force proposes that the national status of these ranges be clearly formalized, that their national responsibilities be clearly delineated and that coordination of their activities in a national sense be centralized under DDR&E.


OUTLINE CHART OF THE WORLD
GLOBAL AREA RESPONSIBILITY
P R
WSMR
AMR

Furthermore, (chart 17) specific geographical areas should be assigned to each range. The Air Force proposes that such areas include:

PMR - The land area of PMR and West to the longitude of Ceylon.

AMR - The land area of AMR and East to the longitude of Ceylon.

WSMR - North and South America except for the land area of AMR and PMR.

The range commanders have already recognized the necessity for close coordination in the interest of standardization and mutual support and have, accordingly, organized the so-called Range Commanders' Conference.

This body has in turn recognized the need for formal detailed coordination, not only among themselves, but with the other service ranges as well and have, therefore, formally established the Inter-Range Instrumentation Group having wide representation and holding frequent meetings to exchange information and resolve problems. The Air Force proposes, that this informal action by the range commanders be formalized by DDR&E and that participation by NASA be included.

A review of the Department of Defense directive announcing the functions and responsibilities of DDR&E reveals that full authority for these actions is already in existence and I quote:

> "III. Paragraph 4 - Develop systems and standards for administration and management of approved plans and programs.
>
> Paragraph 7 - Direct and control (including their assignment or reassignment) research and engineering activities that the Secretary of Defense deems to require centralized management.
>
> Paragraph 9 - Recommend appropriate steps (including the transfer reassignment, abolition and consolidation of functions) which will provide in the Department of Defense for more effective efficient and economical administration and operation, will eliminate unnecessary duplication or will contribute to improved military preparedness."

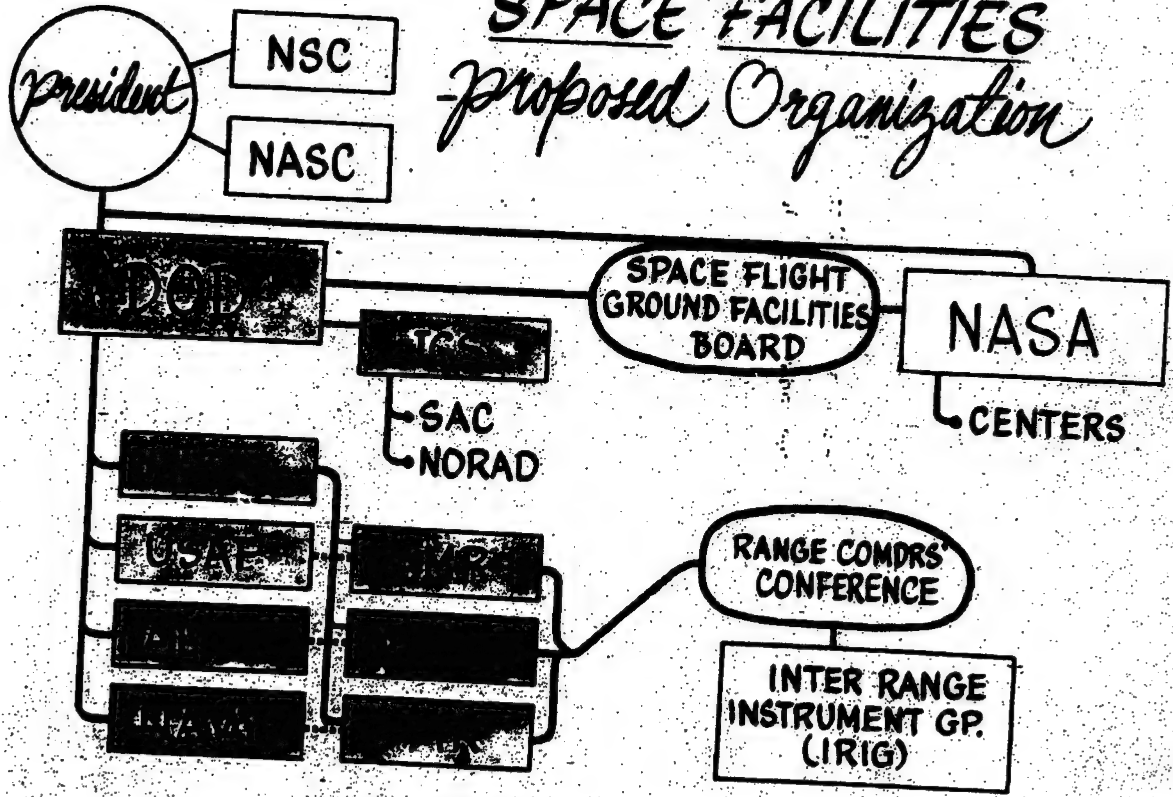
Next, I invite your attention to the box entitled "Space Flight Ground Facilities Board." This board which, I understand, has been jointly considered by the NASA and DOD, has as its charter the responsibilities, "to study and monitor the national requirements for satellite and space vehicle ground instrumentation for the purpose of insuring an effective national program." Two of the detailed responsibilities outlined in this charter are particularly pertinent to this discussion:

> "1. Review all proposals by government agencies for new ground instrumentation facilities intended for tracking, data acquisition and communications where such facilities require establishment of new tracking sites or where a total government investment of more than $250,000 is involved.
>
> 2. Recommend which agency or organization should have responsibility for funding, constructing and operating ground instrumentation facilities."

Unofficially, I understand that DOD coordination on this charter has been withheld pending the conclusion of your study and the receipt of your recommendations. The Air Force recommends that this board be formally activated along the lines of the proposed charter.

You will also note that I have indicated the existence of a DOD coordinator for the MERCURY project. This is based on a formal charter from the Assistant Secretary of Defense and constitutes a precedent which the Air Force recommends for future programs. Namely, it is proposed that when the service or agency responsible for any program ascertains the

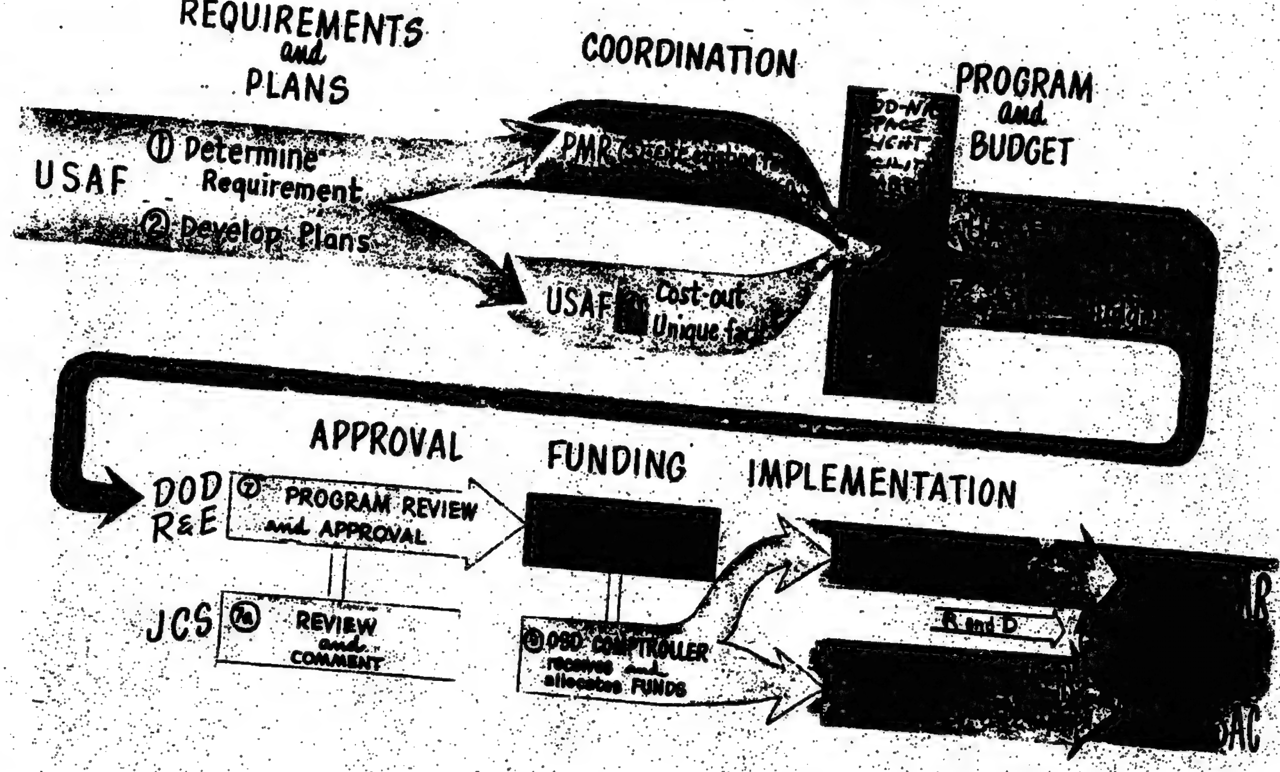
SPACE FACILITIES
Proposed Organization



National range from which its vehicle will be launched, the Commander of that National range would automatically become the OSD coordinator of the total National range resources in support of that program.

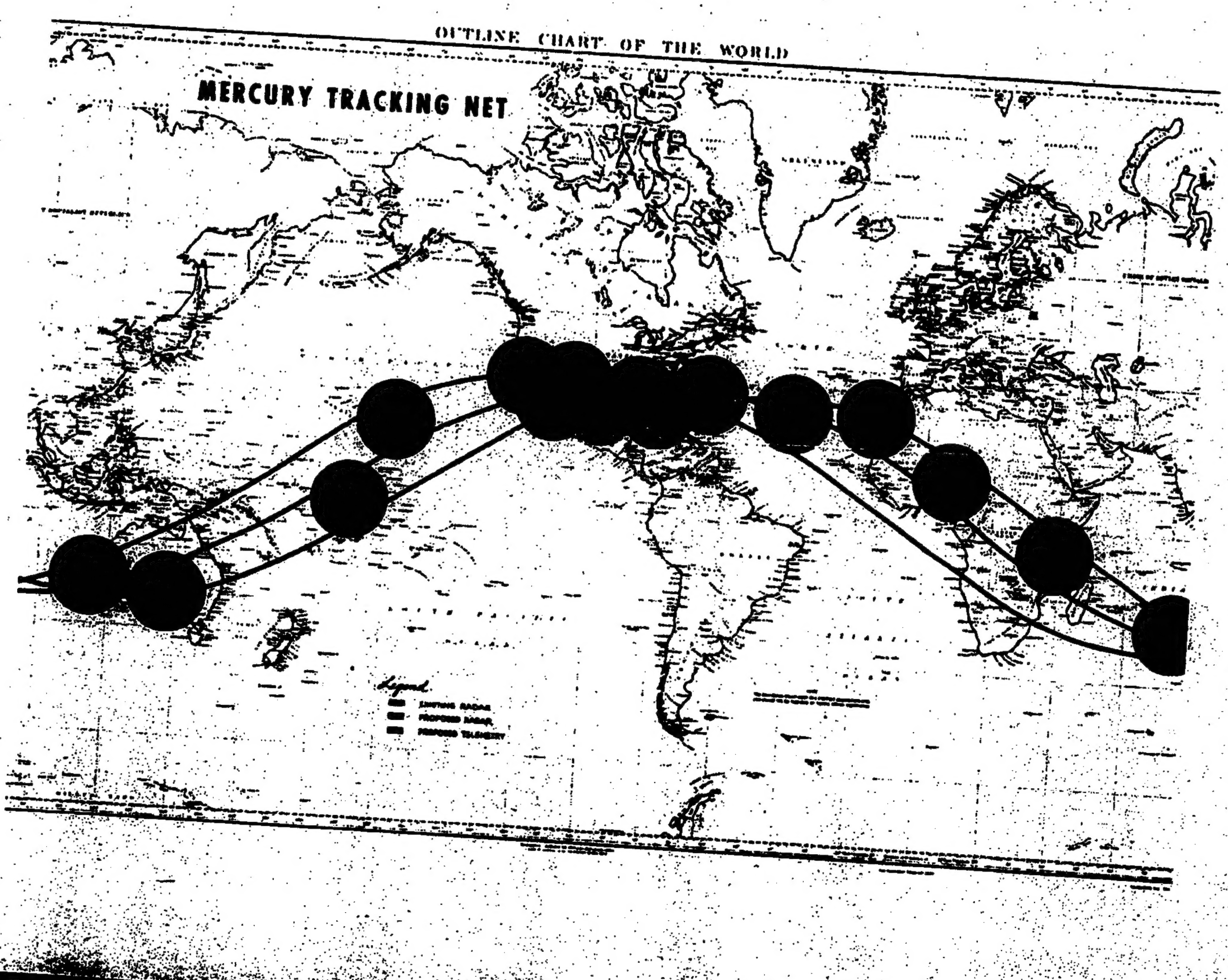
Implementation of these recommended actions would result in the organization depicted on my next chart, (chart 18) which you will note is relatively unchanged from its present configuration. The subtle difference, however, is that it is now vitalized by clear cut policies and procedures. It is the Air Force's firm conviction that this organization can effectively and efficiently manage the program without the necessity for undertaking the additional burden of a new space agency which may only add further confusion and delay to our already tardy efforts.

SAMOS CYCLE


REQUIREMENTS and PLANS
COORDINATION
PROGRAM and BUDGET
USAF
① Determine Requirement
② Develop Plans
PMR
[redacted]
[redacted]
USAF
[redacted]
Cost-out Unique fac
[redacted]
APPROVAL
FUNDING
IMPLEMENTATION
DOD R&E
⑦ PROGRAM REVIEW and APPROVAL
JCS
7a REVIEW and COMMENT
[redacted]
⑧ OSD COMPTROLLER receives and allocates FUNDS
[redacted]
R and D
[redacted]
[redacted]
AR
AC

Let me demonstrate how a typical program would be processed through this National management structure, I have described, when vitalized by the new policies and procedures which the Air Force has recommended. I have chosen as an example the SAMOS and will follow it through the cycle as though it were just being initiated. (chart 19) You will note that all the steps I have described earlier as being typical of all programs, appear as phases of this cycle. We start with the determination of the requirement and the preparation of development and operations plans by the Air Force since the Air Force is the service having mission responsibility. As a part of these plans it will be determined that launchings should occur from the Pacific Missile Range since polar orbits are required. Accordingly, the Commander, PMR, becomes the OSD coordinator for any support required from the three National ranges. It will be his task to examine the data and support requirements outlined in the plan and to cite existing facilities capable of meeting these requirements, and to identify new range facilities which are necessary to augment existing range capabilities. In this connection he will provide detailed schedules and funding requirements for the acquisition of these facilities.

In parallel with this action the Air Force Development Agency will be identifying, in pricing those unique mission oriented facilities, the ground data equipments which will be required to support the plan. Having identified the requirement for new facilities, the next step is to secure the coordination of the OSD/NASA Space Flight Ground Facilities Board. With coordination complete, the Air Force now prepares detailed program plans, including total funding requirements, and submits to OSD for program review and approval. Inasmuch as this is a military requirement for an operational capability to be assigned to the Strategic Air Command, OSD will base its approval on the review and comment by JCS. Funding for the program will follow the normal Congressional action and allocation of funds to OSD Comptroller with fund allocation of the appropriate parts to the Air Force and PMR. With funds now in hand, both agencies can proceed to construct the new equipments required and undertake the conduct of the research and development program. As the R&D program progresses it will begin to accrue information having operational utility which will be processed to the operational agencies for their use, and at an appropriate time the mission, as well as the unique equipment, will be turned over to the Strategic Air Command as the JCS agency responsible for the operational conduct of


OUTLINE CHART OF THE WORLD
MERCURY TRACKING NET
Legend
EXISTING RADAR
PROPOSED RADAR
PROPOSED TELEMETRY

this mission. Note that the common equipment remains with PMR and is available for future use on continuing R&D and for other programs.

Another example of this philosophy in action can be demonstrated by examination of the MERCURY tracking net. In this case we have a NASA program but one which requires substantial support by the national ranges. This chart (chart 20) depicts the major elements of the tracking net and shows that existing radar stations from AMR, PMR, and WSMR are all employed in this net. Additional radars and additional telemetry stations, both shipborne and land based, are being installed to meet the total needs of the program, and it is noteworthy that their installation and operation are under the cognizance of the particular National range which we have proposed should be responsible within the specified geographical areas. Not obvious from this chart, but worthy of note because it demonstrates the philosophy we have proposed, is the fact that at each of these stations new unique equipment is being installed and operated by NASA. This equipment is specifically required for ground to capsule control and communications and as such does not have common use with other programs using the basic capability of these stations.

In summary then, I have pointed out that the space program is a very broad program and that it has many facets with

Recommended Actions BY OSD

1. ESTABLISH 3 NATIONAL RANGES and ASSIGN THEM RESPONSIBILITY for SUPPORT, SERVICE SAFETY FUNCTIONS WITHIN DESIGNATED GEOGRAPHICAL AREAS.
2. FORMALIZE PROPOSED DOD/NASA SPACE FLIGHT GROUND FACILITIES BOARD.
3. FORMALIZE the NAT'L SPACE RANGE COMMANDERS' CONFERENCE and PROVIDE for NASA PARTICIPATION.
4. ASSIGN the RESPONSIBILITY for R&D and OPNS of ALL MIL. SPACE SYS. including OPN'L GDE to the APPROPRIATE MILITARY SERVICES
5. DDR&E REVIEW EXISTING R&D INSTLNS. and, WHERE APPROPRIATE, DIRECT their CONSOLID'N., TRANSFER & DISP.

some common requirements and with some others which are quite unique. I have indicated the over-riding necessity for a systems approach on a concurrent basis for those projects which are intended to ultimately perform an operational mission. I have examined the present national organization and indicated the necessity for certain administrative actions and the establishment of policies and procedures which will make it a highly effective instrument for the national effort. The actions required are few in number and are within the present authority of the Secretary of Defense. They are tabulated on my last chart. (chart 21)